**Project Design Phase**

**Problem – Solution Fit Template**

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| Date | 27 June 2025 |
| Team ID | **LTVIP2025TMID35735** |
| Project Name | **Revolutionizing Liver Care : Predicting Liver Cirrhosis using Advanced Machine Learning Techniques** |
| Maximum Marks | 2 Marks |

**Problem – Solution Fit Template:**

The Problem-Solution Fit simply means that you have found a problem with your customer and that the solution you have realized for it actually solves the customer’s problem. It helps entrepreneurs, marketers and corporate innovators identify behavioral patterns and recognize what would work and why

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| **1.CUSTOMER SEGMENT(S)**  Who is your customer?  Middle-aged working professionals (35–60), especially in urban areas.  Patients with abnormal liver function test results.  General physicians and hepatologists in hospitals or clinics.  Health-conscious individuals with a family history of liver disease. | 5. **AVAILABLE SOLUTIONS**  Current alternatives they might use:  Manual consultation with a hepatologist or GP.  Searching symptoms and lab values online (e.g., WebMD).  Delayed action or inaction due to confusion.  Pros:  Expert human input, potential for deeper diagnosis.  Cons:  Time-consuming, expensive, limited availability in rural areas.  Online self-diagnosis is unreliable and risky. | **8. CHANNELS OF BEHAVIOUR**  8.1 ONLINE:  Google search of symptoms/lab values.  Using health forums or apps like Practo, WebMD.  Watching YouTube health videos.  8.2 OFFLINE:  Visiting local clinics or labs.  Talking to colleagues, family about symptoms.  Attending health check-up camps. |
| 2**. JOBS-TO-BE-DONE / PROBLEMS**  What jobs or problems are you addressing?  Detect liver cirrhosis early from standard blood test data.  Avoid misinterpretation of complex medical data by non-specialists.  Provide a fast, accessible second opinion tool.  Reduce dependency on expensive or invasive diagnostics like biopsies. | 6. **CUSTOMER CONSTRAINTS**  What limitations do customers face?  Lack of medical knowledge to interpret results.  High cost or unavailability of specialists.  Time constraints and fear of hospital visits.  Hesitation due to asymptomatic nature of early-stage cirrhosis. | **9. PROBLEM ROOT CAUSE**  Why does this problem exist?  Liver cirrhosis symptoms appear very late.  Blood test interpretation requires expertise.  Most people don’t prioritize regular liver screening.  General awareness of liver health is low despite rising liver issues due to lifestyle and alcohol. |
| **3. TRIGGERS**  What triggers customers to act?  Confusing liver blood test results (SGOT, SGPT, bilirubin, etc.).  Family urging them to get a second opinion.  Hearing about a colleague or friend diagnosed late with cirrhosis.  Reading a health blog/article warning about fatty liver progression.  4. **EMOTIONS: BEFORE / AFTER**  Before:  Anxious, confused, overwhelmed by medical reports.  Fear of missing work or bad news from doctors.  Denial due to lack of symptoms.  After:  Reassured, informed, empowered.  Motivated to follow up with lifestyle changes or see a specialist.  Relieved due to clarity on health status. | **7. BEHAVIOUR**  What actions do customers currently take?  Search lab values online.  Delay or skip doctor visits unless symptoms worsen.  Ask friends/family for interpretations or suggestions.  Visit a general physician for reassurance. | **10. YOUR SOLUTION**  Your solution:  A machine learning-powered web app (via Flask or Streamlit) that predicts the likelihood of liver cirrhosis using routine blood test data (e.g., albumin, bilirubin, SGOT, etc.).  Features:  Simple form to input lab values.  Instant prediction with confidence level.  Explains which features influenced the prediction (optional SHAP/explainable AI).  Educational content about liver health and next steps. |